WESTBAY® RETROFIT WELL SUMMARY

Location ID: WW-2

Field Representatives: Canavan, Giles, Hunnicutt-Mack, McClure, Pearson, Rivera

Purpose of Well: To monitor plume-front contamination and the effectiveness of the water treatment system for plume stabilization.

Date Started: 1/8/99 **Date Completed:** 4/29/99

Northing: 231398.12 **Easting:** 397055.09

Brass Cap: 4436.45' **Outer Casing:** 4437.37' **Inner Casing:** 4437.74'

Drilling Method: Mud Rotary

Drilling Contractor: Stewart Brothers Drilling Company **Driller:** Paul Hollar

Total Depth Borehole: 1030' **Diameter Borehole:** 12.25" to 105'; Reamed to 17.5"; 12.25" to TD.

Total Depth Surface Casing: 100' **Diameter Surface Casing:** 14" OD

Total Depth Conv. Well Casing: 1005' **Diameter Conv. Well Casing:** 4.5" OD

Total Depth 1.5" OD Westbay® Casing: 995'

Water First Detected: 390' **Water Level Open Borehole:** 330' (from geophysical log)

Water Level Conventional Cased Borehole (post-development SS): 369.70' **Estimated Water Use** (pre-development): 121,600 gallons

Sampling Zones

Screened Zone	Sand Pack	Westbay® Zone (packer to packer)	Meas. Port Depth
488.82' to 498.84'	483' to 505'	485' to 505'	495'
664.13' to 674.22'	658' to 682'	660' to 680'	670'
839.47' to 849.57'	833' to 852'	835' to 855'	845'
954.77' to 964.87'	950' to 970'	950' to 970'	960'

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Conventional Well Casing Used

Diameter: 4.5" OD **Stainless Steel Type:** 304

Schedule 5

5-foot: 0 = 0 ft

10-foot: 0 = 0 ft

20-foot: 0 = 0 ft

Total Sch 5 Footage = 0 ft

Total Footage of Blank Risers: 965 ft

Schedule 10

5-foot: 3 = 15 ft

10-foot: 1 = 10 ft

20-foot: 47 = 940 ft

Total Sch 10 Footage = 965 ft

Stick-Up: 2.4 ft originally. Cut to 1.0 ft 8/99. Final stick-up (from brass cap) = 0.92 ft

Screen Used

Diameter: 4.5" OD **Slot Size:** 0.020" **Stainless Steel Type:** 304

400-600-ft Depth Rating

5-foot: 0 = 0 ft

10-foot: 1 = 10 ft

20-foot: 0 = 0 ft

600-1000-ft Depth Rating

5-foot: 0 = 0 ft

10-foot: 3 = 30 ft

20-foot: 0 = 0 ft

Total Footage of Screen: 40 ft

Annular Materials

Based on field notes and drill reports (approximate totals only).

Sand, grade 30/70
50-lb. Bags : 35

Sand, grade 16/40
50-lb. Bags: 21

Sand, grade 10/20
50-lb. Bags: 425

Sand, grade 8/20
50-lb. Bags : 145

50-lb. Bags Bentonite Pellets: 57

50-lb. Bags Benseal: 91

94-lb. Bags Cement: 90

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Westbay® Casing Used:

10-foot: 88 = 880 ft

5-foot: 13 = 65 ft

2-foot: 2 = 4 ft

Packer: 10 = 50 ft

Total Footage: 999 ft (Later 997 ft)

Regular Couplings: 97

Well Depth: 995 ft

Pumping Ports: 4

Stick-Up: 4 ft joint; 1.71 ft (2 ft joint; 0.71 ft above stainless steel 8/99) Final stick-up (from brass cap) = 1.29 ft

Measurement Ports: 10

End Caps: 1

Magnetic Collars: 4

Pertinent Field Notes

For more detail, refer to Field Notebook #s: DP 392/RFI/CMS (pages 1-22; 31-86; 95-96); TDP 392/RFI/CMS (pages 2-3; 22-23); Westbay® Installation (pages 1-16).

1/6/99-1/7/99	Mobilized to site. Rigged up and mixed mud. - J. Pearson
1/8/99	Spud borehole. Drilled mud rotary 12.25" borehole to 105'. Reamed to 17.5" to 40'. No problems. - J. Pearson
1/9/99	Reamed borehole from 40'-105' below ground surface. Installed 100' of 14" outside diameter (OD) steel surface casing. Grouted casing to surface. - J. Pearson
1/10/99	Drilled mud rotary 12.25" borehole from 105'- 210'. Used 4x8" diameter drill collars; 2x6" diameter collars; and 2 stabilizers. - M. McClure
1/11/99	Drilled 210'-375'. - J. Pearson
1/12/99	Drilled 375'-520'. Hauled 3 loads of water. - M. Rivera

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Pertinent Field Notes Cont.

1/13/99	Drilled 520'-627'. Shut down early to perform maintenance on hydraulic pump. - M. Canavan
1/14/99	Drilled 627'-720'. End 10 day shift. - M. Rivera
1/19/99	Drilled 720'-850'. - M. Canavan
1/20/99	Drilled 850'-1015' in Santa Fe Group Alluvium. - M. Canavan
1/21/99	Drilled 1015'-1030' (Total Depth). Ran final Totco Drift Survey with <1° drift. Good borehole. Circulated to clean borehole and tripped out to drill collars. Shut down due to high winds. Southwest Geophysical Services, Inc. on site, but will log tomorrow. - M. Canavan
1/22/99	Tripped drill collars out. Geophysical logging was completed by SW Geophysical Services. Pipe was laid down on pipe truck in preparation to rig down and move to next location (JP-3). - L. Hunnicutt
1/23/99	Rigged down, decontaminated rig and pipe, and mobilized to JP-3. - L. Hunnicutt
NOTE:	Installation of stainless steel casing was delayed because casing was not present on site. While waiting for stainless steel casing to arrive, pilot boreholes were drilled and surface casing was set at JP-3 and ST-7.
2/2/99	Re-mobilized to WW-2 (from ST-7), mixed mud, and tripped in drill collars to 335'. Bridging or swelling clays from 120'-335'. Hauled 2 loads of water. - L. Hunnicutt
2/3/99	Tripped in to TD (able to break through bridge) and circulated to clean borehole. Prepared for well installation. Transported casing to well pad. Tripped out to 780'. - M. Canavan
2/4/99	Tripped in to 1030' (TD), circulated borehole for 30 minutes, tripped out drill pipe and collars, and tripped in tremie pipe. Installed 1007.4' of 4.5" OD stainless steel casing in borehole. Well depth is 1005' with 2.4' stick-up. - G. Giles, L. Hunnicutt, and M. McClure
2/5/99	Washed heavy mud from borehole. Installed annular materials to 970' (just below the first or bottom screen). Hauled 4 loads of water. - L. Hunnicutt and M. McClure

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Pertinent Field Notes Cont.

2/6/99	Installed annular materials to 874.8' (just below the second screen). Benseal yielded varying footages and is difficult to tag (sound). - L. Hunnicutt
2/7/99	Installed annular materials to 821' (to the bentonite seal above the second screen). Switched from Benseal to holeplug (bentonite chips) for more predictable yield and easier tag. Began installing bentonite with polymer in water to slow hydration followed by 1 bag sand (for an easier tag).- L. Hunnicutt
2/8/99	Installed annular materials from 821'-660'. Used 2 bags of holeplug followed by 20 bags sand for bentonite/sand mix intervals between screened zones (still a 50/50 ratio). Mixed polymer with bentonite to slow hydration. - M. McClure.
2/9/99	Installed annular materials from 660'-472' (top of top screen). - M. McClure
2/10/99	Installed annular materials from 472'-206' (top of last bentonite/sand mix interval). Installed plug of cement/Calcium Chloride mix from 206'-200'. Bailed the stainless steel casing to assure no grout invasion. - M. McClure
2/11/99	Grouted to surface. Used 70 bags cement. Mobilized rig to JP-3. End of shift. - J. Pearson.
2/16/99-2/20/99	Bailed well. 2,810 gallons removed. Water changed from dark opaque beige and soapy to light brown and not soapy. - G. Giles, L. Hunnicutt, and M. McClure
2/21/99-2/25/99	Swabbed well. 65 gallons removed from first screen (top); 2,500 gallons from second screen; 4,995 gallons from the third screen; and 5,490 gallons from the bottom screen. - L. Hunnicutt and M. McClure
3/3/99-3/5/99	Pumped well. 4,820 gallons removed from the first screen (top). Water cleared from 2.18-1.97 NTU; 4,740 gallons from the second screen. Water cleared from 2.17-1.82 NTU; 2,960 gallons from the third screen. Water cleared from 3.68-1.5 NTU; and 3,420 gallons from the fourth screen. Water cleared from 12.8-2.14 NTU. - G. Giles and M. McClure

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Pertinent Field Notes Cont.

3/10/99	Camera logged WW-2. Top 100' of water was cloudy with reddish material on inside of casing. Bottom screen had bentonite invasion. Jetted bottom screen. Used 2 loads of site water (chlorinated; approximately 6,400 gallons). - M. McClure
3/11/99	Jetted bottom screen. Used 3 loads of site water (chlorinated; approximately 9,600 gallons; 16,000 gallons total jetting). Effluent cloudy and gritty. - M. McClure
3/29/99	Camera logged the well again. Approximately 138 feet of sand and mud in sump.
4/1/99-4/2/99	Bailed/Pumped WW-2 sump. 438 gallons were removed. 4-6 inches of silt and fine sand were removed from the bailer each run. - G. Giles
4/6/99-4/8/99	Bailed/pumped just above the bottom screen. 3,018 gallons removed. Water was muddy tan-brown. Pumped 3,050 gallons from sump. Cleared to 3.67 NTU. - J. Pearson
4/9/99	Pumped 2,000 gallons from the third screen; pumped 2,000 gallons from the second screen; pumped 2,000 gallons from the top screen; and pumped 2,000 gallons from the top of the water in the well casing (1.47 NTU). -G. Giles
4/10/99	Camera logged WW-2. The water and the bottom screen are clear.
4/13/99	Set-up tables and Westbay® MP 38 1.5" OD PVC casing. Installed 370' Westbay® casing. - L. Hunnicutt-Mack and M. McClure
4/14/99	Installed Westbay® casing to 615'. Pulled back out and placed magnetic collars on casing. Re-installed and joint tested to 635'.- M. McClure
4/15/99	Installed Westbay® casing from 635'-995' (TD). 4.4' stick-up; 2' stick-up above the stainless steel casing. Completed a casing integrity (leak) test. Casing did not leak. Inflated packer number one (bottom) and a portion of packer number two. Pump was leaking heavily. - L. Hunnicutt-Mack, M. McClure, and J. Pearson.
NOTE:	Westbay® packer inflation suspended until the pump was fixed.
4/21/99	Inflated packer numbers three through five. - M. McClure

Pertinent Field Notes Cont.

4/22/99	Inflated packer numbers six through nine. Inflated packer number ten partially. Pump was leaking. - G. Giles, M. McClure, M. Rivera
4/29/99	Packer inflation completed with a pump loaned from Westbay®. - M. McClure
	Installation complete. Turned well over to Technicians for Westbay® development.
8/99	The stainless steel 4.5" OD casing was cut to 1.0 ft above the surface casing.